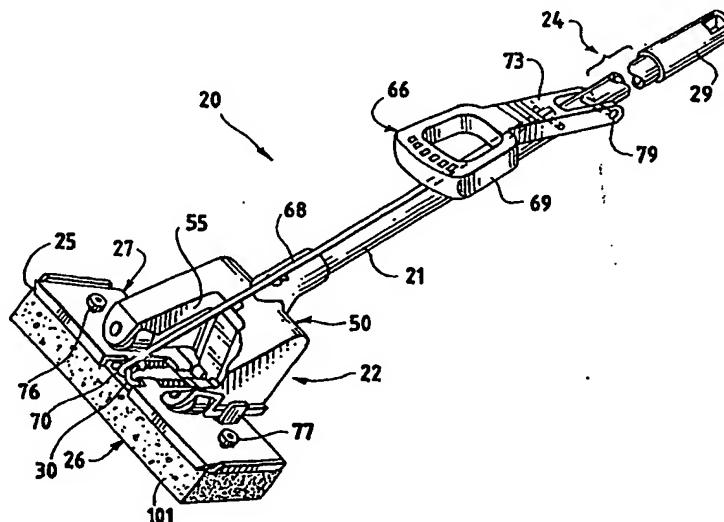




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>A47L 13/144, 13/12</b>	<b>A1</b>	<b>(11) International Publication Number:</b> <b>WO 99/09876</b> <b>(43) International Publication Date:</b> 4 March 1999 (04.03.99)
<b>(21) International Application Number:</b> PCT/US98/00637 <b>(22) International Filing Date:</b> 15 January 1998 (15.01.98) <b>(30) Priority Data:</b> 60/057,088                      27 August 1997 (27.08.97)                      US <b>(71) Applicant (for all designated States except US):</b> FREUDENBERG HOUSEHOLD PRODUCTS LP [US/US]; 2021 West Street, River Grove, IL 60171 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> SPECHT, Paul, B. [US/US]; 241 Laurel Street, Wilmette, IL 60091 (US). WAGNER, Edgar [US/US]; 3804 North Tripp Avenue, Chicago, IL 60641 (US). <b>(74) Agents:</b> ANDERSON, Theodore, W. et al.; Leydig, Voit & Mayer, Ltd., Suite 4900, Two Prudential Plaza, 180 North Stetson, Chicago, IL 60601-6780 (US).		<b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>

(54) Title: MOPS AND MOP COMPONENTS



## (57) Abstract

Disclosed is a butterfly mop having an elongate shaft (21) with a channel body (50) disposed at one end of the shaft, the channel body having first and second leg portions (51, 52) defining a channel therebetween, the mop further having a mop element (26) including a foldable, compressible, liquid-absorbent member. The mop element and channel body are hingedly movable along a hinge line (62) relative to one another, whereby the mop element may be drawn into the channel causing the mop element to fold along a transverse axis and to become compressed between the channel body leg portions. A manual actuation mechanism includes a handle (66) and a tension rod (68) connecting the handle to one of the mop element and channel body for effecting relative hinged movement thereof. The mop element preferably includes plural pairs of apertures (135-138) for allowing mounting of the mop element to variously sized mop element supports.

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**MOPS AND MOP COMPONENTS****RELATED APPLICATION**

5 This application claims priority to U.S. Patent Application Serial No. 60/057,088, filed August 27, 1997, the disclosure of which is hereby incorporated by reference in its entirety.

**TECHNICAL FIELD OF THE INVENTION**

10 The present invention is directed toward mops, and more specifically, is in the field of butterfly mops.

**BACKGROUND OF THE INVENTION**

15 A butterfly mop is characterized in that it comprises an elongate, foldable, compressible, liquid-absorbent member, such as a sponge, which is disposed at one end of a mop shaft, and which is used to absorb liquid, typically  
20 water, from a surface. When it is desired to expel liquid from the absorbent member, portions of the absorbent member are folded over one another along a transverse axis of the absorbent member and are compressed, using a folding mechanism such as a roller or track. Butterfly mops are so  
25 named because the folding and unfolding of the absorbent member along its transverse axis is said to resemble the motion of the wings of a butterfly.

One typical butterfly mop is shown in U.S. Patent 2,892,201. As shown therein, the butterfly mop includes an  
30 elongate liquid absorbent member, a plate connected to a surface of each "wing" of the liquid absorbent member, and an activating rod pivotally connected to a portion of each of the plates adjacent the other plate. The plates are drawn along the dual arms of a yoke-like track to thereby  
35 fold the liquid absorbent member over onto itself and to compress the liquid absorbent member within a compression space disposed between and defined by the dual arms of the

track. Numerous other butterfly mops are known in the prior art.

5 A common problem with conventional butterfly mops is the difficulty inherent in manually applying sufficient force to the actuating mechanism to fold the liquid absorbent member over onto itself and to compress the liquid absorbent member sufficiently to satisfactorily expel liquid therefrom. Indeed, in typical butterfly mops, substantial physical effort may be required to compress the absorbent member. Another drawback lies in the difficulty of removing a spent liquid absorbent member and of attaching a new liquid absorbent member. Known absorbent members typically are sized to be received by and supported on only one type of mop. A liquid absorbent member from one mop often will not fit on a second mop, and thus retailers must stock many different sizes of mop elements.

10 It is a general object of the present invention to provide a mop that overcomes these drawbacks of earlier mops.

#### 20 SUMMARY OF THE INVENTION

The invention overcomes these drawbacks by providing a mop including a channel body comprising spaced-apart first and second leg portions defining a channel therebetween. The channel body uniquely cooperates with an elongate mop element comprising a foldable, compressible liquid absorbent member. In accordance with the invention, the channel body and mop element are disposed in a relatively hinged relationship with respect to one another along a hinge line lying along a longitudinal axis of the mop element. The mop element and the channel body are relatively movable over a range of travel between an open mop element position and a closed position wherein the mop element is folded about a central transverse portion and is rotated to a position within the channel. A tension rod

connects a manually operable handle to the central portion of the mop element remote from the channel hinge portion for effecting relative hinged movement of the mop element and the channel body. When tension is applied to the rod, the liquid absorbent member is drawn into the channel and is compressed therewithin to thereby expel water therefrom, the mop element folding about its transverse central portion upon compression. The relatively hinged relationship of the mop element and the channel body and the butterfly action of the absorbent member provides a leveraged relationship that effectively multiplies the force applied by an operator to fold and compress the mop element. This leveraged relationship reduces the manual force necessary to draw the absorbent member into the channel to thereby expel liquid therefrom. In accordance with preferred embodiments of the invention, the actuating handle is pivotally mounted to the shaft about a pivot axis, and comprises an elongate member terminating in an operator gripping portion, whereby a pivotal motion of the gripping portion relative to the shaft creates tension in the rod.

In accordance with particularly preferred embodiments of the invention, the mop includes a mop element support having a first wing, and a second wing, and a link portion supported on the body and including a liquid absorbent mop element mounted on the wings. In this embodiment, the first leg portion of the channel body includes a first roller rotatably journaled thereto and engaging the first wing, and the second leg portion includes a second roller rotatably journaled thereto and engaging the second wing. The rollers and wings serve to guide the liquid absorbent mop element into the channel.

In accordance with a highly preferred embodiment of the invention, the mop element includes a compressible liquid absorbent outer layer and a flexible, relatively

tough inner layer adapted to overlies the mop element support. The wings of the support are provided with apertures which align respectively with apertures in the inner layer of the mop element. Fasteners are used to maintain the inner layer against the support. Most preferably, the fasteners comprise a rivet portion having an apertured head and a longitudinally slotted outer sleeve, and an inner pin portion having a headed end and an operative end opposite thereof. By introducing the headed end of the pin portion into the slot of the rivet portion, the pin engages and enlarges the outer sleeve to removably retain the inner layer and wing together. By so attaching the mop element to the mop element support, the mop element may be quickly and easily removed when spent, and may be readily replaced with a fresh mop element. The mop element may be provided with plural apertures sized to fit a variety of mop element supports.

#### DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view, partially cut-away, of the mop of the invention.

Fig. 2 is an enlarged perspective view of the operator handle of the mop shown in Fig. 1.

Fig. 3 is an enlarged plan view of the mop element end of the mop shown in Fig. 1, illustrating the mop element in an upwardly facing position.

Fig. 4 is an enlarged plan view, partially cut-away, of the mop element end of the mop shown in Fig. 1, illustrating the mop element in a downwardly facing position.

Fig. 5 is an enlarged plan view of the mop element end shown in Figs. 1-4 showing the mop element as it is being drawn into the channel body.

Fig. 6 is an enlarged plan view of the mop element end shown in Figs. 1-5, showing the mop element fully withdrawn

into the channel body.

Fig. 7 is a side representational view of the mop of Figs. 1-6, showing the mop element fully withdrawn into the channel body as shown in Fig. 6.

5 Fig. 8 is a perspective view, partially cut away, of the mop element assembly of the mop of the invention, illustrating the mop element and a portion of the mop element support.

10 Fig. 9 is a perspective view of a fastener useful in conjunction with the present invention.

Fig. 10 is a perspective view of one embodiment of the invention, showing the mop element secured to the mop element support with two of the fasteners shown in Fig. 9.

15 Fig. 11 is a perspective view of an alternative embodiment of the mop of the present invention.

20 While the foregoing drawings are described with reference to the "upwardly" and "downwardly" facing positions, it should be understood that these designations refer to the floor engaging position and are for convenient reference only. In practice, the mop of the invention has no spatial orientation.

#### DESCRIPTION OF THE INVENTION

25 Referring now to Figs. 1-4, the butterfly mop 20 generally includes a mop shaft 21 having a mopping end 22 and a gripping end 24. Disposed at the mopping end 22 is a mop element assembly 25 including a mop element 26 and a mop element support 27. The mop element 26 includes an absorbent member of spongy material as shown in Fig. 1 and  
30 a flexible, relatively tough inner layer (not shown in Fig. 1) which is secured to the support 27 by fasteners 76, 77. At the gripping end 24 of the mop shaft 21 is disposed a hanger clip 29 for supporting the mop for storage.

35 With particular reference to Figs. 3 and 4, the mop element 26 comprises a flexible, compressible absorbent

member which absorbs liquid and from which liquid may be expelled upon compression thereof. The mop element has a longitudinal axis 31 and a central transverse axis 32 generally perpendicular to the longitudinal axis 31. The central axis 32 divides the mop element generally into two regions, a first region 34 and a second region 35. The mop element is disposed on the mop element support 27, which support comprises a first wing 37 and a second wing 38 generally coinciding with respective regions 34, 35 of the mop element 26. As shown more particularly in Fig. 4, the support 27 includes a link 40 connected to the wings 37, 38 such that the wings are hingedly secured to first and second link arms 42, 43, respectively. The support further includes biasing means for urging the wings and the respective mop element regions toward longitudinally aligned positions. Preferably, the biasing means comprises a dual coiled spring 45 having first and second legs 47, 48 (shown in phantom in Fig. 4) engaging the respective wings 37, 38. Alternatively, the biasing means may comprise two single coil springs (not shown) or another suitable spring mechanism.

The mop further includes a channel body 50, as shown, for example, in Figs. 1, 3, and 4. With reference to Fig. 4, the channel body 50 includes a first leg 51 and a second leg 52 connected by a bight portion 54, and a channel 55 generally defined by a space between the first leg 51 and the second leg 52. First and second rollers 58, 59 are rotatably journaled respectively on the first and second legs 51, 52 and positioned continuously to engage respectively the first and second wings 37, 38. The channel body 50 may be secured to the shaft by any suitable means, such as by fastener 56 as shown in Fig. 4.

In accordance with the invention, the mop element 26 is disposed in a relatively hinged relationship with respect to the channel body 50. In a preferred embodiment,



the link 40 of the mop element support 27 is connected to the channel body 50 at a trunnion 61, as illustrated in Fig. 4. The hinged mounting of the link 40 in the trunnion 61 defines a hinge line 62 across the width of the link 40, which hinge line is generally perpendicular to the transverse central axis 32 of the mop element 26. The hinged relationship between the mop element 26 and the channel body 50 and the wedging action as the wings 37, 38 are drawn between the rollers 58, 59 provides effective multiplication of the force applied to the mop element 26 as it is drawn into the channel body 50, thus easing the wringing operation. Tabs disposed in the wing may be provided to inhibit translation of the mop element along its longitudinal axis.

An actuation mechanism 66 is provided for wringing the mop, as shown in Fig. 1. The actuation mechanism 66 preferably comprises a tension rod 68 having an operator end connected to a handle 69. As shown in Fig. 2, the handle 69 is generally elongate and includes an operator gripping portion 71, a pivotal connection 73 to the tension rod 68 and a pivot 79 for connection to mop shaft (not shown in Fig. 2). The tension rod is operatively connected to the mop element assembly 25, and preferably is connected to the mop element 26 via the mop element support 27. By applying tension to the tension rod 68, the operator causes the mop element 26 to move hingedly with respect to the channel body 50 and to be drawn into and compressed within the channel 55.

Operation of the mop is progressively illustrated in the plan views of Figs. 4-6 and in the side view of Fig. 7. The mop element is shown in a mopping position in Fig. 4. When it is desired to expel liquid from the mop element, tension is applied to the tension rod 68 (shown in Figs. 5 and 6) whereupon the mop element 26 begins to fold along the central transverse axis 32 and to be drawn into the

channel body 50. Fig. 5 illustrates the mop element when partially drawn into the channel body, and Figs. 6 and 7 illustrate the mop element when fully withdrawn into the channel body. During operation, the wings 37, 38 travel in a complex path including a generally arcuate path, as illustrated by arrow 74 in Fig. 7. In the embodiment illustrated in Figs. 5 and 6, the mop element is secured to the mop element support with screw-type fasteners 76, 77 which pass through apertures in the wings 37 and 38 and which are secured in threaded apertures in the inner layer of the mop element 26.

The operator handle 69 is pivotally mounted to the shaft 21 at the pivotal mounting 79 as shown, for example, in Fig. 1. In the embodiment shown in Fig. 1, the tension rod 68 has an eyelet 70 which extends around a shaped intermediate portion 30 of link 40 between arms 42 and 43. The rod 68 is also secured to the handle 69 at a pivotal connection 73 disposed between the handle operator gripping portion and the pivotal mounting of the handle on the shaft as a second order lever.

Fig. 11 illustrates an alternative embodiment of the mop 20' of the invention utilizing a handle 69' having a central pivot point 79'. The tension rod 68' is disposed on the opposite end of the shaft 21' and is secured to the handle 69' at pivot 73'. In this embodiment, the tension rod extends through an aperture 80' in the connecting portion 54' of the channel body 50'. The pivotal mounting 79' of the handle 69' to the shaft 21' is disposed between the operator gripping portion of the handle 69' and the pivotal connection 73' of the handle 69' to the tension rod 68' as a first order lever.

A preferred embodiment of the mop element of the invention is illustrated in Fig. 8. In this embodiment, the mop element 100 is a laminar structure, and comprises a compressible liquid absorbent member 101 having a support

surface 102, which preferably is a generally planar surface. Overlying at least a portion of the support surface is a flexible, relatively tough inner layer 104, which preferably is made of plastic, such as polypropylene. The inner layer 104 is adapted to overlie a mop element support 106 (partially shown in Fig. 8). The inner layer 106 may be continuous, but is preferably discontinuous across the central transverse axis 107 of the mop element 100, and preferably includes spacing ribs 109 on at least a portion thereof.

Many known mop elements designed for use with butterfly mops include two upwardly and inwardly extending threaded posts positioned for alignment with respective holes in the mop element support. The mop element is secured to the support by inserting the posts into the aligned apertures and securing the post with a threaded cap. In accordance with the present invention, the mop element 100 instead has at least one aperture, and preferably includes at least a pair of apertures 110, 111, which are positioned for alignment with respective holes 112, 113 in the mop element support. To secure the mop element to the support, a fastener, and preferably a pair of fasteners, are provided. Each fastener is separate from the mop element and includes a post portion for extending through the aligned apertures in the mop element and mop element support, the fastener engaging the mop element and mop element support to thereby releasably secure the mop element to the support.

In accordance with one preferred embodiment of the invention, the fasteners comprise removable rivets, such as those rivets sold under the trademark TUFLOK® by ITW Fastex®. For example, as illustrated in Fig. 9, the removable rivet 120 comprises a rivet portion 121 and an inner plug portion 123. The rivet portion has a headed end 124 and a longitudinally slotted outer sleeve 126 with an

inward annular projection 125 adjacent the slotted portion thereof. The inner plug has a head 128 and an operative tapered pin 129 opposite the head 128. The operative pin 129 of the plug 123 is inserted into the sleeve when the  
5 headed portions 124, 128 of the respective rivet portion 121 and pin portion 123 are longitudinally spaced, and when the pin portion 123 is longitudinally moved toward the headed end 124 of the rivet portion 121. When the pin is partially extended through the sleeve 126, the pin engages  
10 the inner annular projection 125 and enlarges the sleeve 126 to secure the rivet in place. Fig. 10 illustrates an embodiment of the mop of the invention wherein the mop element 100 is secured to the mop element support 130 via two removable rivets 131, 132. The invention is not  
15 limited to the foregoing types of fasteners, and indeed other fasteners can be used in conjunction with the invention. For example, it is contemplated that the aperture, in the mop element may include screw threads, and the fastener may include a shank portion having threads or  
20 other projections for engaging the screw threads in the mop element, thereby allowing the shank portion to be screwed and/or pushed into the aperture and thereby secured.

In accordance with a highly preferred embodiment of the invention, as shown in Fig. 8, the mop element 100 has  
25 a central transverse axis 107 dividing the mop element into two regions 133, 134, and includes inner layer portions 104 having plural apertures in each region 133, 134. For example, the mop element 100 shown in Fig. 8 includes apertures 135, 136, which define a second pair of apertures  
30 positioned for alignment with respective apertures in a second mop element support (not shown). Thus, the mop element may be secured to mop element supports of various sizes. For example, in Fig. 8, apertures 110, 111 are aligned with respective apertures 112, 113 in the mop  
35 element supports. However, it is contemplated that the

pair of apertures 135, 136 could be used to secure the mop element 100 to a support having differently spaced apertures (not shown) which apertures align respectively with apertures 135, 136. The mop element shown in Fig. 8 further includes a third pair of apertures 137, 138 for mounting to yet a third mop element support (not shown).

The mop element of the invention is not limited to the configuration shown. For example, the apertures in the mop element may be positioned in any location necessary for alignment with respective apertures in any number of mop element supports. Similarly, while the fastener shown in Fig. 9 is the preferred embodiment of the fastener useful in conjunction with the invention, it is contemplated that other forms of fasteners could be employed. The mop element and one or more fasteners may be provided in the form of a kit, the kit being adapted for securing the mop element to several differently sized mop element supports.

Thus, it is seen that the invention has overcome the drawbacks inherent in the prior art, and has achieved the foregoing general objects. The relatively hinged relationships between the respective wings and between the mop element and the channel body allow a user readily to apply sufficient force to the actuating mechanism to fold the liquid absorbing mop element over onto itself and to compress the mop sufficiently to satisfactorily expel liquid therefrom. Moreover, the mop element and kit of the invention are versatile, and allow a single mop element to be supported on variously sized mop element supports. Thus, a retailer need only carry one brand or type of mop element, rather than different replacements for a variety of mops.

While particular embodiments of the invention have been shown, it will be understood that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing

5 teachings. It is, therefore, contemplated by the appended claims to cover any such modifications as incorporate those features which constitute the essential features of these improvements within the true spirit and scope of the invention.

## WHAT IS CLAIMED IS:

## 1. A mop comprising:

an elongate shaft having a mopping end and a gripping end;

a channel body disposed at said mopping end of said shaft and comprising spaced-apart first and second leg portions defining a channel therebetween;

a mop element comprising a flexible, compressible, elongate liquid absorbent member, said mop element having a central axis, said mop element being disposed in a relatively hinged relationship with respect to said channel body along a hinge line, said hinge line being generally perpendicular to said central axis;

an elongate rod having an operator end and operatively connecting said operator end to one of said mop element and said channel body,

whereby the application of longitudinal force in said rod relative to the other of said mop element and said channel body causes relative hinged movement of said mop element and said channel body about said hinge line thereby drawing said mop element into said channel and causing said mop element to fold at said central axis and to become compressed between said channel body portions.

2. A mop according to claim 1, further comprising an operator handle, said operator handle including a gripping portion, a pivotal mounting on said shaft, and a pivotal connection to said operator end of said rod whereby pivotal motion of said gripping portion relative to said shaft creates tension in said rod.

3. A mop according to claim 1, said central axis dividing said absorbent member into first and second portions, said mop including a mop element support including a first wing connected to said first portion of

said absorbent member and a second wing connected to said second portion of said absorbent member.

4. A mop according to claim 3, said mop element support including biasing means urging said first and second wings and mop element portions toward a coplanar relationship.

5. A mop according to claim 3, said mop element support including a link connecting said first wing to said second wing, said wings being hingedly connected to said link.

6. A mop according to claim 5, wherein said link has a first arm and a second arm, said first wing being hingedly connected to said link at said first arm and said second wing being hingedly connected to said link at said second arm.

7. A mop according to claim 5, said link being connected to said channel body at a hinge trunnion, said hinge trunnion defining a hinge axis, said hinge line being defined by said hinge axis.

8. A mop according to claim 3, said first leg portion including a first roller rotatably journaled thereon and engaging said first wing, said second channel body portion including a second roller rotatably journaled thereon and engaging said second wing, whereby said relative hinged movement of said mop element and said channel body causes said wings to roll in a generally arcuate path relative to said channel body portions.

9. A mop according to claim 1, said channel body having a connecting portion interlinking said first and



second leg portions.

10. A mop according to claim 5, said rod extending through said connecting portion.

11. A mop according to claim 5, said rod extending around said connecting portion.

12. A mop comprising:

an elongate shaft having a mopping end and an operator end;

a channel body disposed at the mopping end of said shaft and comprising a first channel body leg and a second channel body leg defining a channel therebetween;

an elongate mop element support having a first wing, a second wing, and a link therebetween, said link being hingedly secured along its length to said first wing and to said second wing, said link having a hinge axis across its width corresponding to the width of said channel, said support being mounted for rotation about said axis within said channel;

a flexible, compressible, liquid absorbent mop element overlying said support and having ends secured to first and second wings respectively; and

a tension rod generally aligned with said shaft, passing between said legs and pivotally secured to a position on said link displaced from said hinge axis,

whereby the application of tension in said rod relative to said shaft rotates said link about said hinge

axis to rotate said wings relative to said legs and relative to said link whereby said wings are closed together to a compressed position between said legs.

13. The mop of claim 12 including a handle having a gripping end, a pivotal mounting on said shaft and a pivotal connection to said rod whereby pivotal motion of said gripping end creates tension in said rod.

14. The mop of claim 13 wherein said pivotal connection is disposed between the gripping end and the pivotal mounting.

15. The mop of claim 12 including bias means urging said wings and said ends apart hingedly.

16. The mop of claim 15, said bias means comprising a spring.

17. The mop of claim 16 wherein each leg includes a roller rotatably mounted at the end thereof, engaging the respective wing, whereby rotation of said link causes said wings to roll in an arcuate path relative to said legs about said hinge axis between said compressed position and a position generally aligned with said link.

18. The mop of claim 12 including a roller rotatably mounted at the end of each leg and engaging the respective wing whereby rotation of said link causes said wings to roll in an arcuate path relative to said legs about said hinge axis.

19. The mop of claim 12 wherein said mop element includes a compressible, liquid absorbent outer layer and a flexible tough inner layer adapted to overly the support,

said inner layer being in alignment with said wings and detachably secured thereto.

20. The mop of claim 19 wherein each wing has a wing aperture and said inner layer has an aperture aligned with each wing aperture and a fastener disposed in each wing aperture and engaging the respective aperture in said inner layer whereby said inner layer is maintained against said support.

21. An elongate mop element for use with a mop element support having a first wing and a second wing, each with a mounting aperture therein, and an intermediate portion between the wings, said intermediate portion being adapted for mounting to a mop shaft, said element comprising:

a compressible, liquid absorbent outer layer and a flexible tough inner layer adapted to overly the support, said inner layer having an aperture in alignment with the respective apertures in said wings; and,

fasteners disposed in each of said first and second wing apertures, each of said fasteners engaging the respective aperture in said inner layer whereby said inner layer is maintained against said support, each of said fasteners comprising: a rivet portion having a headed end and a longitudinally slotted outer sleeve; and an inner pin portion having a headed end and an operative end opposite the headed end thereof, the operative end thereof received within said sleeve when partially extended therein with the headed portions of the rivet portion and pin portion longitudinally spaced, whereby, when the head of said pin is moved longitudinally toward the head of said sleeve, the operative end thereof engages and enlarges said slotted

outer sleeve to retain said respective inner layer and wing together in a retained condition.

22. The mop element of claim 21 wherein said slotted sleeve has an inward projection portion and said pin portion is shaped to interact therewith to retain said inner pin portion in said retained position.

23. A mop comprising:

an elongate shaft having a mophead end and an operator end and defining a shaft axis;

a mophead disposed at the mophead end and including a body defining a plane having a longitudinal axis normal to said shaft axis and a central transverse axis forming an acute angle with said shaft axis, said body defining a central channel aligned with said central transverse axis and extending into said body toward said operator end of said shaft, and a mop element comprising an elongate flexible, compressible, liquid absorbent member overlying said body and aligned with said plane, said mop element having a central axis overlying said channel, one portion of said mop element overlying said channel being hingedly supported relative to said body normal to said transverse axis; and

an elongate tension rod operatively connected through said channel to said element at a portion thereof transversely spaced from said one portion,

whereby tension in said rod relative to said shaft causes the portions of said element extending outwardly from said channel to fold together and be rotated about said one portion into said channel.

24. A mop comprising:  
an elongate shaft having a mopping end and an operator  
end;

a mophead disposed at the mopping end of said shaft and including a body supported at the mopping end and defining a mop element plane and a central channel extending into said body from said mop element plane toward said operator end, and an elongate, flexible compressible, liquid absorbent mop element having a central transverse section supported on said body along said plane and having end portions extending longitudinally outwardly therefrom, one end portion of said central transverse section being hingedly supported in said channel; and

a rod generally aligned with said shaft and pivotally secured adjacent the other end of said central transverse section,

whereby longitudinal force in said rod relative to said shaft rotates said central transverse section about said one portion whereby said ends are closed together within said channel to compressed positions.

25. A mop element to be mounted on one of a plurality of different mop element supports comprising:

a compressible liquid absorbent member having a longitudinal dimensional and a generally planar surface having a transverse central axis, said central axis dividing said surface into a first region and a second region;

a first and a second aperture in said first region;

a first and a second aperture in said second region;

said first aperture in said first region corresponding to said first aperture in said second region thus defining a first pair of apertures positioned for alignment with respective apertures in a first mop element support; said second aperture in said first region corresponding to said second aperture in said second region thus defining a second pair of apertures positioned for alignment with respective apertures in a second different mop element support.

26. A mop element according to claim 25, wherein said mop element includes a third aperture in said first region and a third aperture in said second region, said third aperture in said first region corresponding to said third aperture in said second region thus defining a third pair of apertures positioned for alignment with respective apertures in a third different mop element support.

27. A mop element according to claim 25, wherein said mop element includes a relatively tough covering layer having first and second sections overlying respectively at least a portion of said first region and a portion of said second region, wherein said apertures are disposed respectively in said first and second sections of said covering layer.

28. A mop according to claim 27, wherein said covering layer is discontinuous across said central axis.

29. A kit comprising:

a mop element to be mounted on a mop element support, said mop element comprising:

a compressible liquid absorbent member having a longitudinal dimension and a generally planar surface having a transfer central axis, said central axis dividing said surface into a first region and a second region;

an aperture in said first region;

an aperture in said second region, said apertures positioned for alignment with respective apertures in such mop element support; and

two removable rivets, each of said rivets comprising:

a rivet portion having a headed end and a longitudinally slotted outer sleeve; and

a pin portion having a head and an operative end opposite the head, the operative end thereof being received within the sleeve of said rivet portion when partially extended therein with the headed portions of the rivet portion and pin portion longitudinally spaced, whereby, when the head of said pin is moved longitudinally toward the head of said sleeve, the operative end thereof engages and enlarges said outer sleeve.

30. The kit of claim 29 wherein said slotted sleeve has an inward projection portion and said pin portion is shaped to interact therewith to retain said inner pin portion in said retained position.

31. A kit according to claim 29, wherein said mop element has a second aperture in said first region and a second aperture in said second region, said second aperture in said first region corresponding to said second aperture in said second region thus defining a pair of second apertures positioned for alignment with respective apertures in a second different mop element support.

32. A kit comprising:

a mop element to be mounted on a mop element support, said mop element comprising:

a liquid absorbent member having a support surface;

an aperture in said support surface; said aperture positioned for alignment with a respective aperture in such mop element support; and

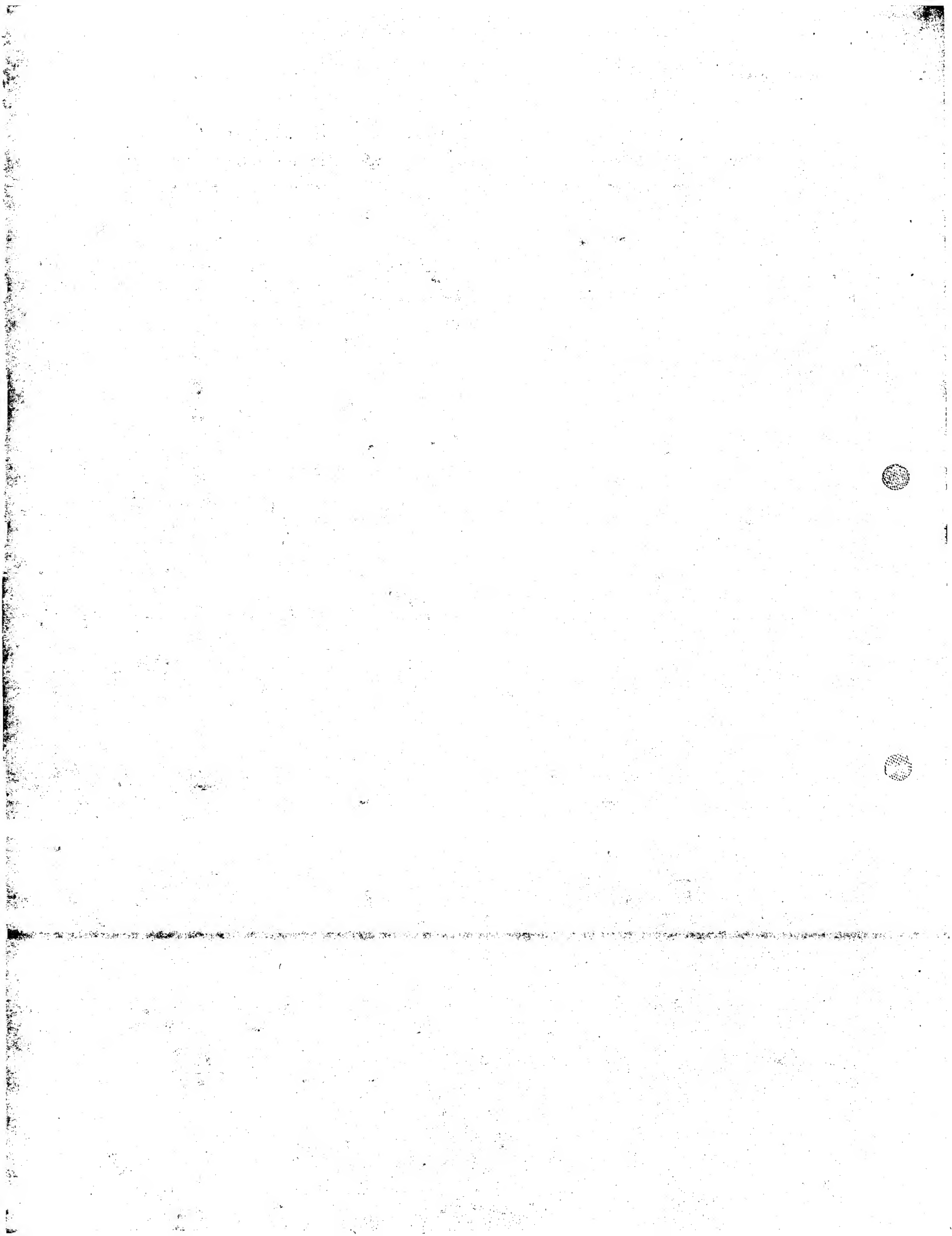
a fastener for releasably securing said mop element to said mop element support when said apertures are aligned, said fastener being separable from said mop element and including a post portion for extending through said aligned apertures, said fastener releasably engaging at least one of said mop element and said mop element support thereby releasably securing said mop element to said mop element support.

33. A kit according to claim 32, wherein said fastener comprises a removable rivet.

34. A kit according to claim 32, wherein said support surface includes plural apertures positioned for alignment with respective plural apertures in a mop element support.



35. A kit according to claim 34, wherein said support surface includes a first pair of apertures and a second pair of apertures, said first pair of apertures positioned for alignment with a respective pair of apertures in a first mop element support and said second pair of apertures positioned for alignment with a respective pair of apertures in a second different mop element support.



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FIG. 1

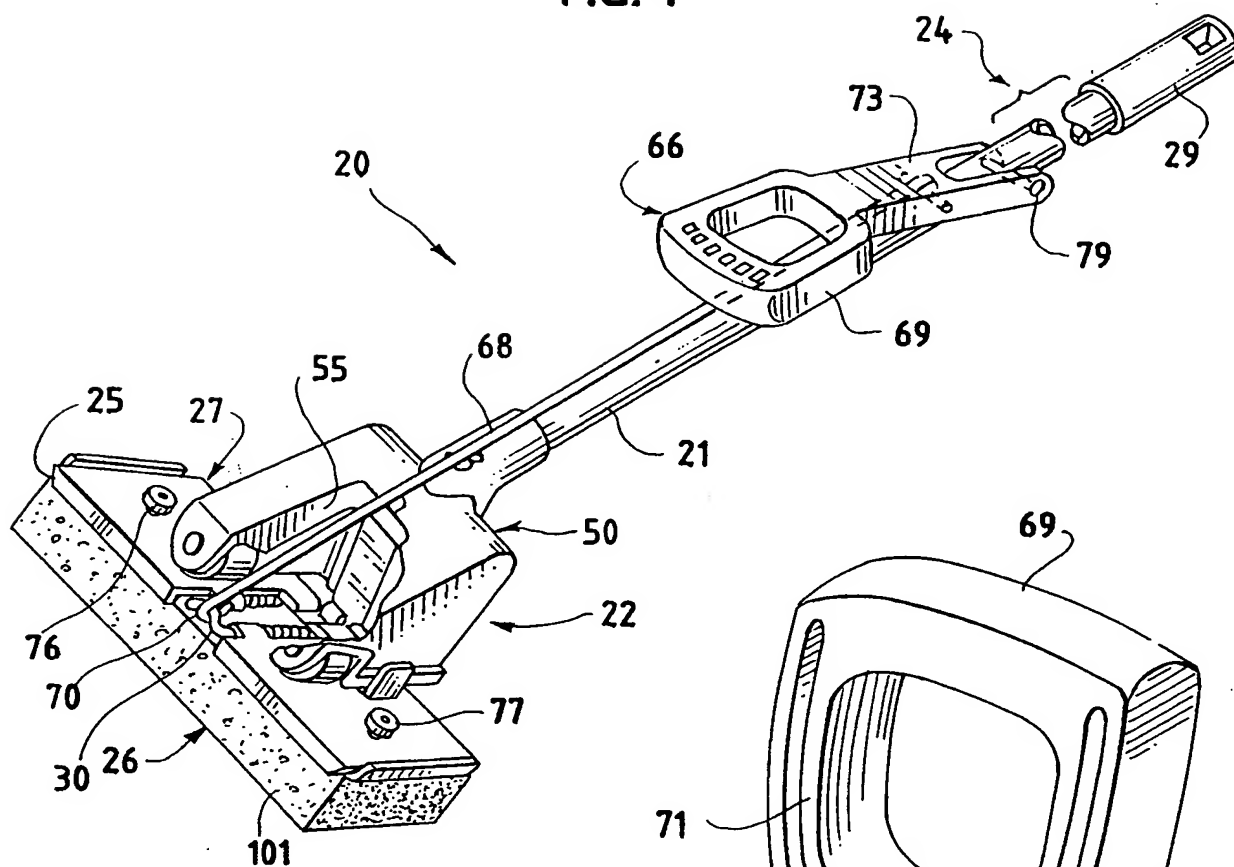
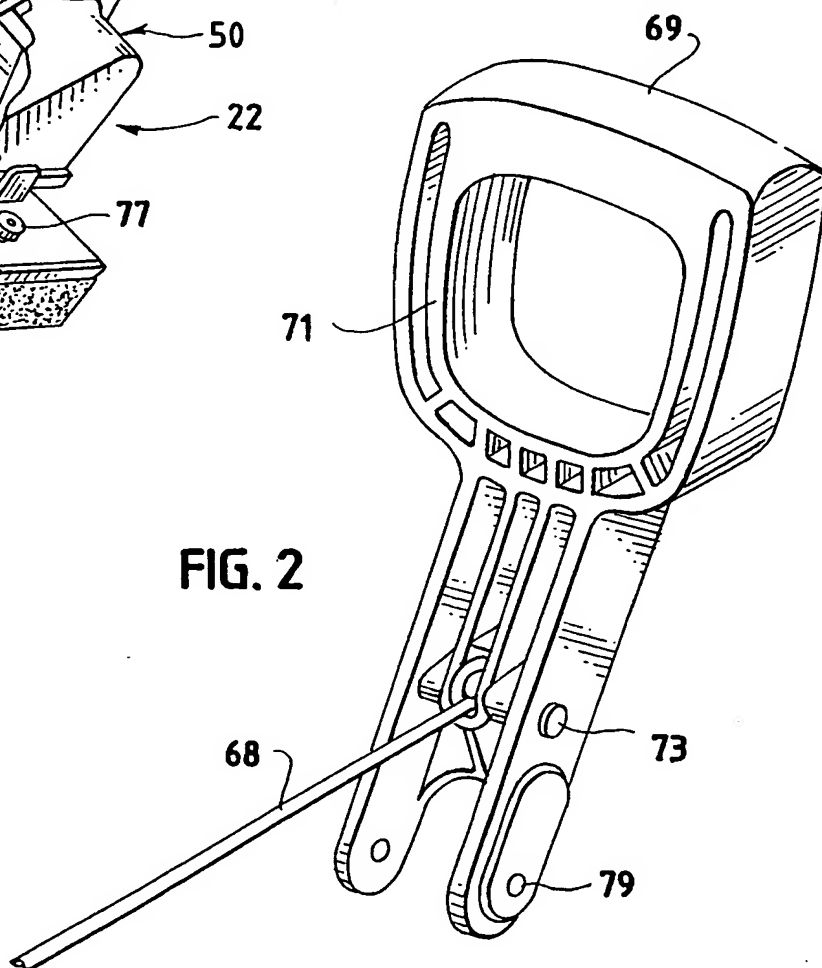


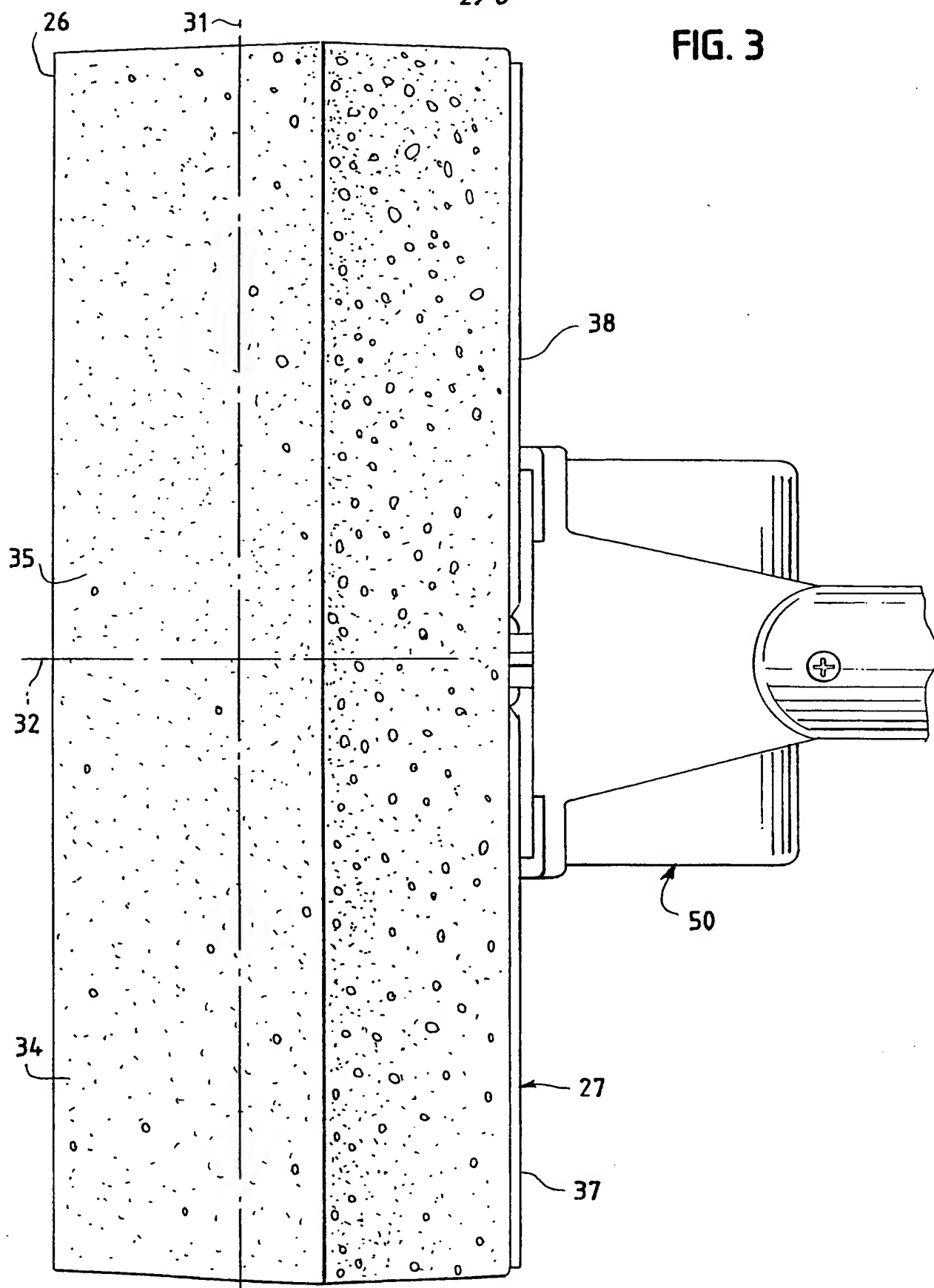
FIG. 2





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FIG. 3

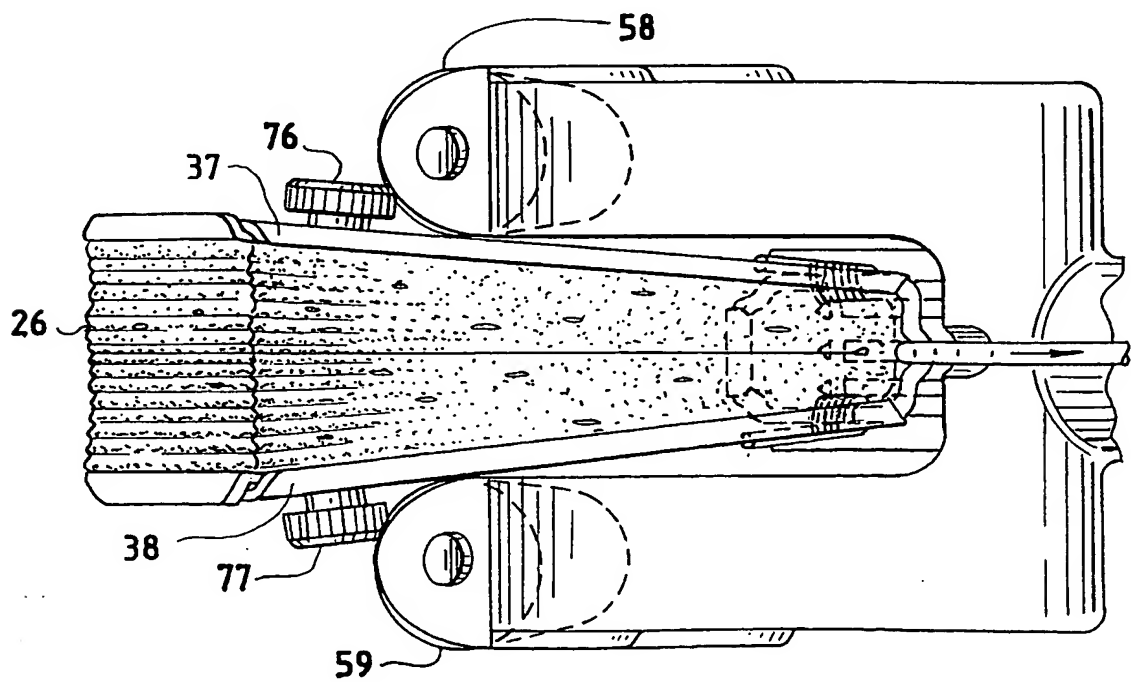
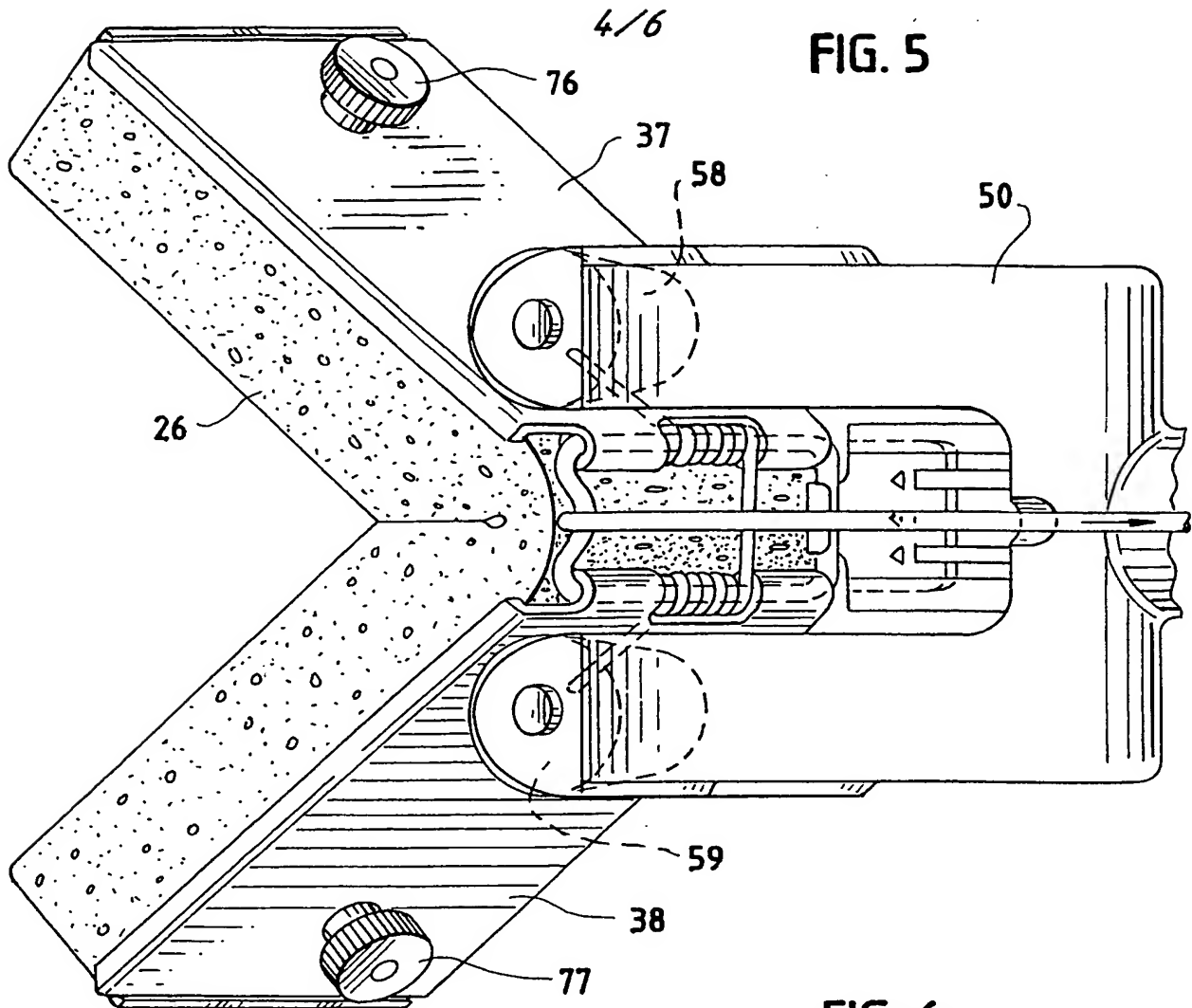














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FIG. 7

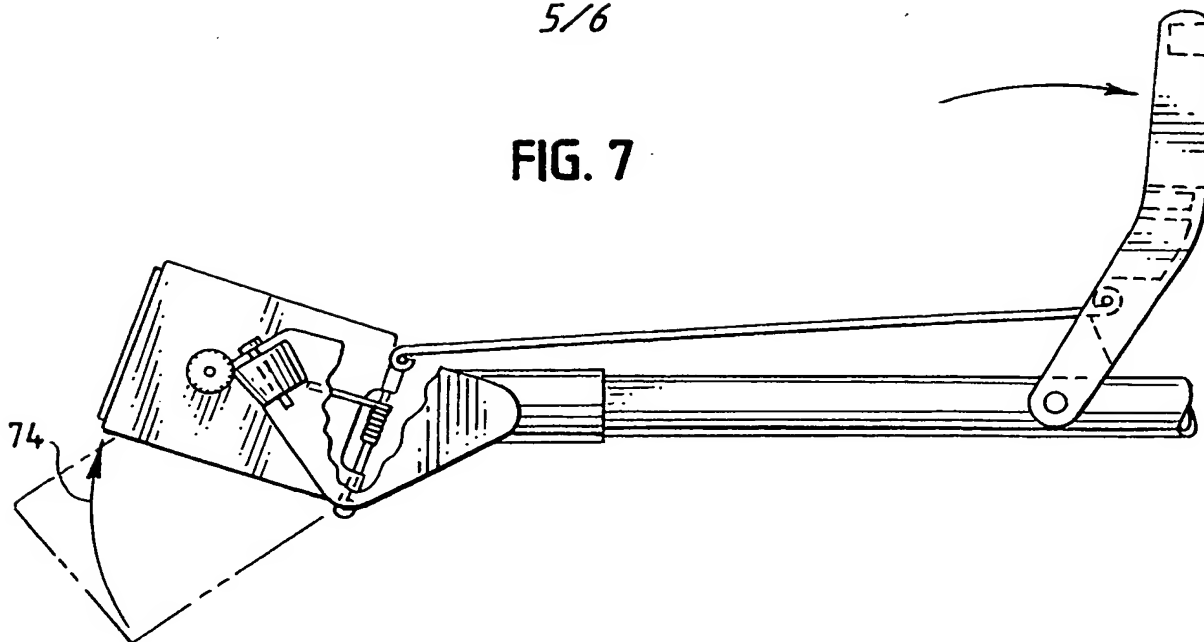


FIG. 8

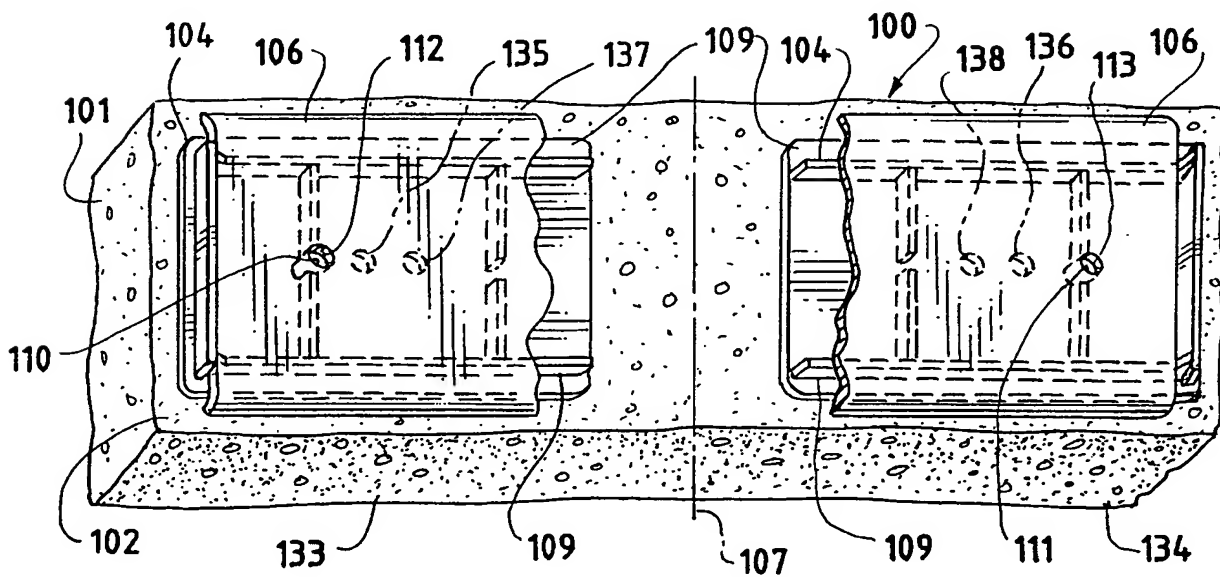
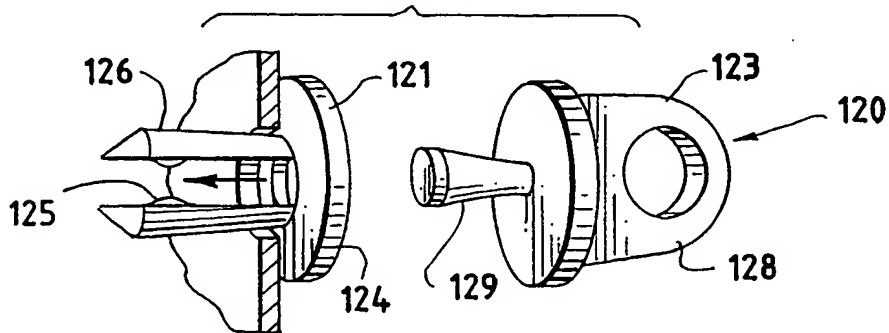


FIG. 9





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FIG. 10

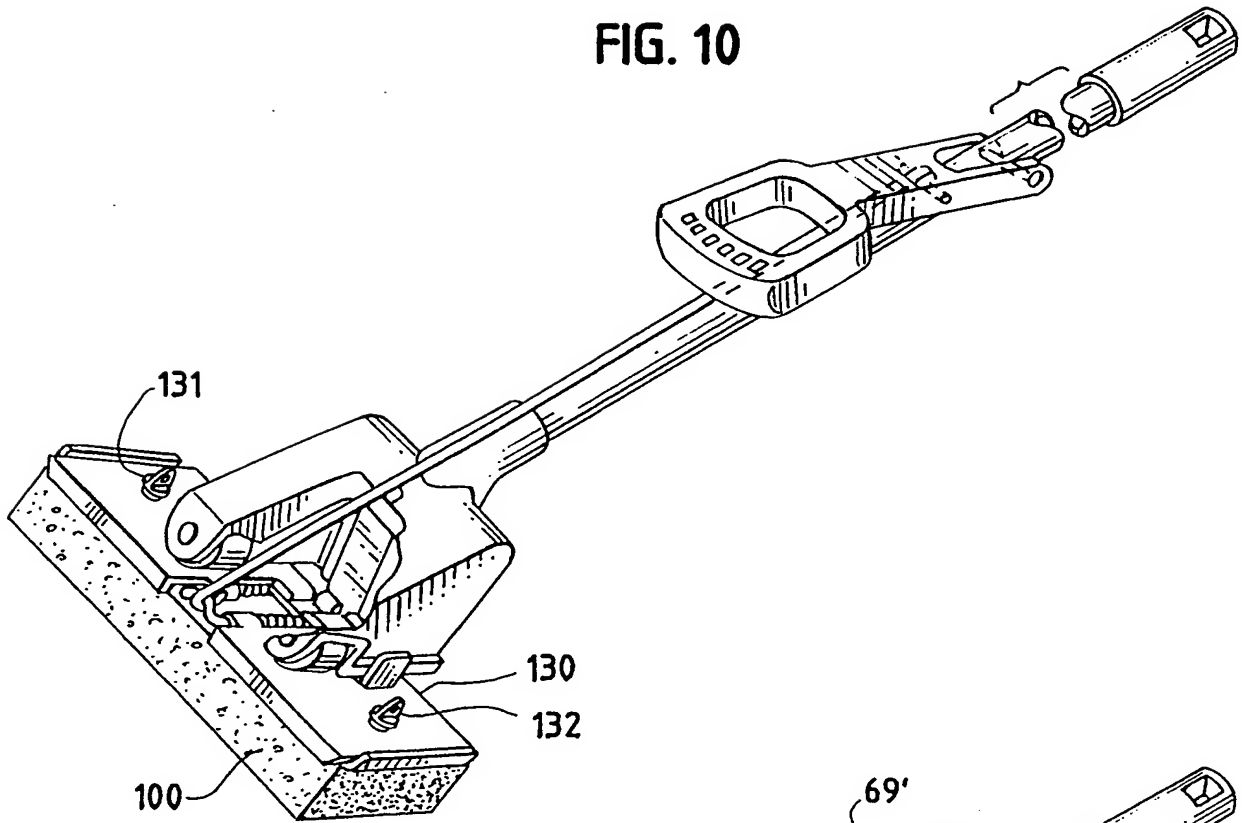
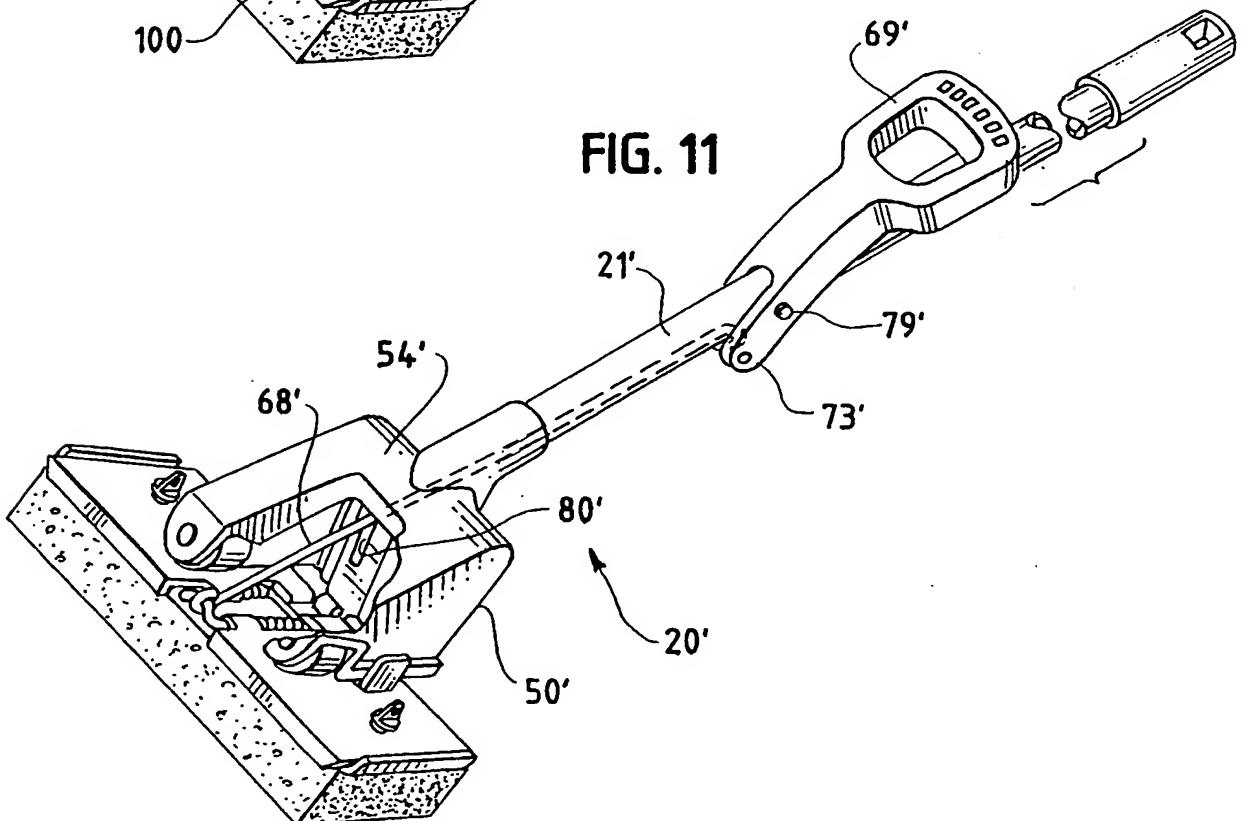
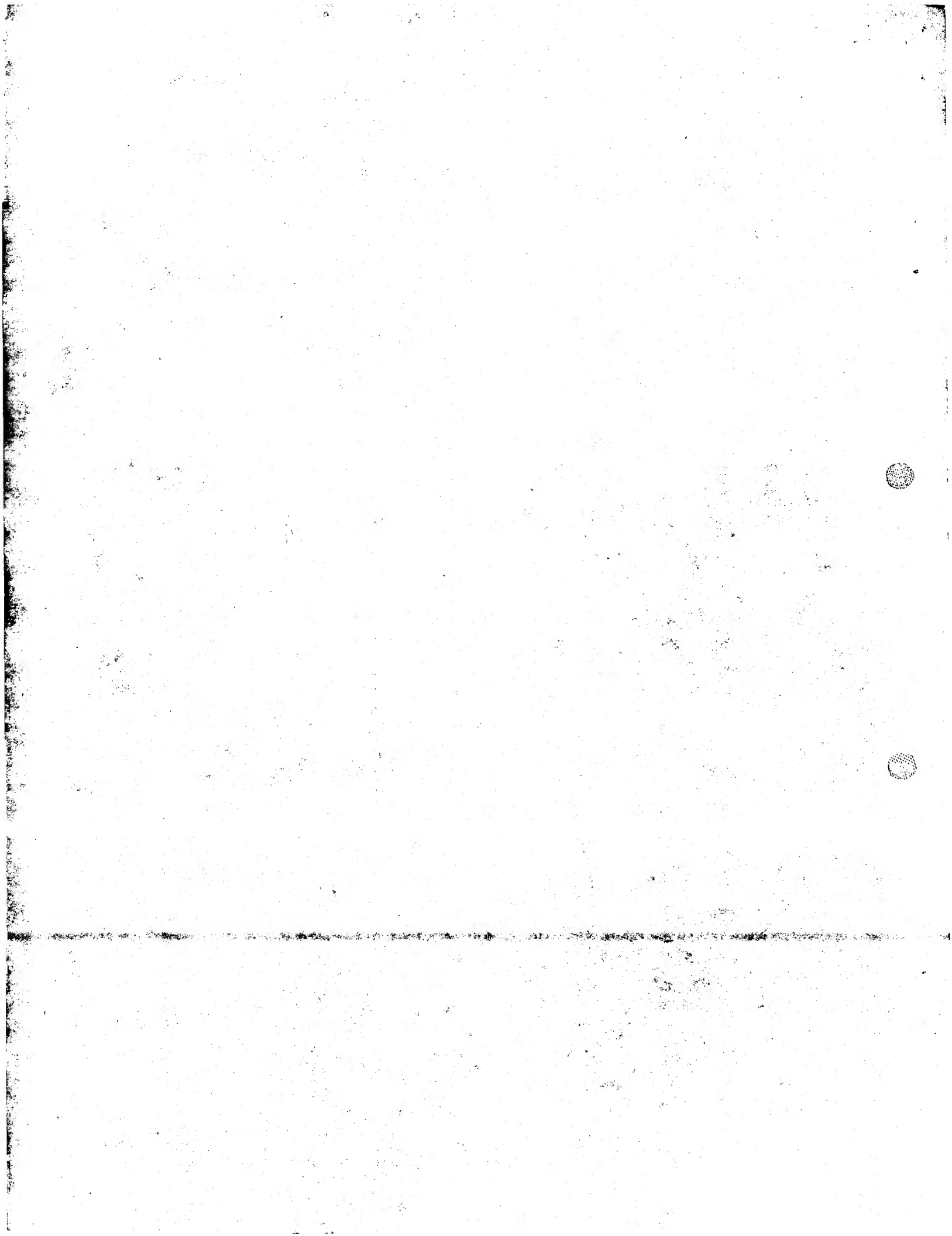


FIG. 11





## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US98/00637

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC(6) : A47L 13/144, 13/12

US CL : 15/119.2, 228,

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 15/119.2, 228, 119.1, 116.2, 244.1, 244.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,131,111 A (RICHARDSON et al.) 21 July 1992, col. 4, lines 1-20.	1,3,4-6,11
X	US 2,852,794 A (BLUM) 23 September 1958, col. 3, lines 15-42.	1,2,8,9,23,24
X	CA 767,342 A (SMYTH et al.) 19 September 1967, page 3, line 20 to page 4, line 8.	1,2,3,5,6,9,10,23,24
X	GB 932,579 A (MURPHY) 31 July 1963, page 2, lines 5-30.	25-28,32-35



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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Date of the actual completion of the international search

04 MAY 1998

Date of mailing of the international search report

20 MAY 1998

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